

REMARKS

In the Office Action, dated June 30, 2005, the Examiner rejected claims 1-11 and 16-20 under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,762,483 (hereinafter “KRIVOKAPIC”). By way of this amendment, Applicants have canceled claims 12-15, that have been withdrawn due to a restriction requirement, without prejudice or disclaimer. Applicants reserve the right to file a divisional application directed to the subject matter of canceled claims 12-15. Claims 1 and 16 have been amended to improve form. New claim 21 has been added. No new subject matter has been added way of the present amendment. Reconsideration of the outstanding rejections is respectfully requested in view of the amendments above and the following remarks.

On page 2, the Office Action rejects claims 1-11 and 16-20 under 35 U.S.C. § 102(e) as allegedly being anticipated by KRIVOKAPIC. Applicants respectfully traverse.

Amended independent claim 1, for example, recites “forming a fin on a substrate,” “forming a mask on the substrate,” “etching the mask to expose a channel area of the MOSFET,” “thinning a width of the fin in the channel area, wherein thinning the width of the fin comprises etching one or more surfaces of the fin using a fluorine (F) plasma process” and “forming a gate over the fin, the gate extending on each side of the fin.”

A proper rejection under 35 U.S.C. § 102 requires that a reference teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present. See M.P.E.P. § 2131. KRIVOKAPIC does not disclose or suggest the combination of features recited in Applicants' amended claim 1.

For example, KRIVOKAPIC does not disclose or suggest, among other features, “thinning a width of the fin in the channel area, wherein thinning the width of the fin

comprises etching one or more surfaces of the fin using a fluorine (F) plasma process," as recited in amended claim 1. At column 3, lines 24-40, KRIVOKAPIC discloses:

Two fins 405 may be formed from fin layer 105, as shown in FIG. 4. Fins 405 may be formed beneath spacers 305 and caps 205 using, for example, conventional etching processes. Fins 405 may include a width w_2 ranging from about 50 Å to about 500 Å. Thermal oxidation may then be performed and the oxide removed to thin down fins 405 to create thinned fins 505, as shown in FIGS. 5A and 5B. The thickness t of thinned fins 505 may range from about 100 Å to about 1000 Å. Oxide spacers 305 may also be removed, as further shown in FIGS. 5A and 5B, during the oxide removal. The thinning of fins 505, thereby, improves the short-channel effects in a double-gate FinFET that can result from the above-described process (with the addition of double gates that are not shown). The exemplary process described above for forming thinned fins for a double-gate FinFET additionally may increase the device density, thus, reducing the device pitch.

KRIVOKAPIC, thus, discloses using a process in which sidewalls of fins 405 may be thermally oxidized, and the oxide may then be removed to produce thinned fins 505. KRIVOKAPIC, however, does not suggest or disclose, among other features, "thinning a width of the fin in the channel area, wherein thinning the width of the fin comprises etching one or more surfaces of the fin using a fluorine (F) plasma process," as recited in amended claim 1. Withdrawal of the rejection of amended claim 1 under 35 U.S.C. § 102 is, therefore, respectfully requested.

Claims 2-11 depend from claim 1 and, therefore, patentably distinguish over KRIVOKAPIC for at least the reasons set forth above with respect to claim 1.

Amended independent claim 16 recites "patterning a fin area, a source region, and a drain region on a substrate," "forming a fin in the fin area," "forming a mask in the fin area," "etching the mask to expose a channel area of the MOSFET," "etching the fin to thin a width of the fin in the channel area, wherein etching the fin to thin a width of the fin comprises at

least one of: using a fluorine (F) plasma process to etch the fin, or using a hydrogen bromide (HBr) based plasma chemistry to etch the fin,” “forming a gate over the fin” and “forming contacts to the gate, the source region, and the drain region.” As discussed above with respect to claim 1, KRIVOKAPIC discloses the use of a process in which sidewalls of fins 405 may be thermally oxidized, and the oxide may then be removed to produce thinned fins 505. KRIVOKAPIC, however, does not suggest or disclose, among other features, “etching the fin to thin a width of the fin in the channel area, wherein etching the fin to thin a width of the fin comprises at least one of: using a fluorine (F) plasma process to etch the fin, or using a hydrogen bromide (HBr) based plasma chemistry to etch the fin,” as recited in amended claim 16. Withdrawal of the rejection of claim 16 under 35 U.S.C. § 102 is, therefore, respectfully requested.

Claims 17-20 depend from claim 16 and, therefore, patentably distinguish over KRIVOKAPIC for at least the reasons set forth above with respect to claim 16.

New claim 21 recites “forming a fin on a substrate,” “forming a mask on the substrate,” “etching the mask to expose a channel area of the MOSFET,” “thinning a width of the fin in the channel area, wherein thinning the width of the fin comprises etching the fin using a hydrogen bromide (HBr) based plasma chemistry” and “forming a gate over the fin, the gate extending on each side of the fin.” KRIVOKAPIC does not suggest or disclose, among other features, “thinning a width of the fin in the channel area, wherein thinning the width of the fin comprises etching the fin using a hydrogen bromide (HBr) based plasma chemistry,” as recited in new claim 21. Applicants, therefore, respectfully submit that new claim 21 patentably distinguishes over KRIVOKAPIC.

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's reconsideration of this application, and the timely allowance of the pending claims. To the extent necessary, a petition for an extension of time under 37 CFR § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,



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